

California Current Cetacean & Ecosystem Survey (CalCurCEAS)
Jay Barlow, Chief Scientist
End of Leg 2 Report: Sep 13 – Sep 19, 2014

Synopsis (Eric Archer, Cruise Leader)

Although we've had our share of rough weather, our final week of Leg 2 has also given us some of our busiest days. The most action happened mid-week on the 16th during an eastward transect towards the Oregon/California border. From the start of effort to late-afternoon, we were pelted with sighting after sighting of humpbacks (*Megaptera novaengliae*) and fin whales (*Balaenoptera physalus*) to the point that there was hardly a region to look in that didn't have whales blowing. As if the whales weren't keeping us busy, we also had several sightings of Pacific white-sided dolphins (*Lagenorhynchus obliquidens*) and our first sightings of the leg of northern right whale dolphins (*Lissodelphis borealis*), some of which were seen riding the bow wake of a fin whale. To cap it all off the day ended with a close encounter with some blue whales (*Balaenoptera musculus*) from which we got a biopsy and some good photos.



The following day, we started at the same point, but headed south. The balance shifted to a predominance of fin whales. In fact, fin whales have been the most frequently sighted species on this leg, so if anyone is missing some, we know where they are.

During this leg, transits over several seamounts have been treated us to sightings of sperm whales as well as a couple of groups of Baird's beaked whales. Interestingly, after looking through the photos, one of the sperm whales seen on September 13th turned out to be the same as a whale that was seen almost a month ago on the first leg on August 18th, approximately 220 nm to the northwest.



As we finish the last few days of the leg heading for our inport in San Francisco, we want to extend our thanks to the crew of the *R/V Ocean Starr* for taking such excellent care of us. They are a fantastic group of professionals who are also an absolute pleasure to work with.

Search Effort by Day (Paula Olson, Juan Carlos Salinas, Suzanne Yin, Adam Ü, Jim Gilpatrick, Jim Carretta, Bennie Johnson, Elanor Miller, Eric Archer)

Date	Time	Latitude	Longitude	Distance	Beaufort
091314	0714	N42:32.06	W127:08.76	48.8 nmi	4.7
	1906	N43:29.95	W126:53.92		
091414	0706	N44:10.38	W128:13.21	66.4 nmi	3.5
	1930	N42:51.33	W128:41.61		
091514	0717	N42:40.93	W128:02.41	53.1 nmi	2.9
	1929	N42:23.57	W126:36.11		
091614	1113	N42:09.13	W125:21.20	37.8 nmi	2.1
	1917	N41:51.65	W124:16.48		
091714	0713	N42:10.35	W125:39.57	37.0 nmi	3.7
	1706	N41:06.09	W125:58.30		
091914	0721	N41:05.27	W127:37.32	26.5 nmi	4.3
	1718	N40:51.99	W126:37.05		

Number of Cetacean Sightings by Species

CODE	SPECIES	TOT#
013	<i>Stenella coeruleoalba</i>	2
017	<i>Delphinus delphis</i>	11
022	<i>Lagenorhynchus obliquidens</i>	15
027	<i>Lissodelphis borealis</i>	3
040	<i>Phocoena phocoena</i>	22
044	<i>Phocoenoides dalli</i>	15
046	<i>Physeter macrocephalus</i>	5
049	ziphiid whale	1
063	<i>Berardius bairdii</i>	2
070	<i>Balaenoptera</i> sp.	24
071	<i>Balaenoptera acutorostrata</i>	1
074	<i>Balaenoptera physalus</i>	25

075	<i>Balaenoptera musculus</i>	1
076	<i>Megaptera novaeangliae</i>	22
077	unid. dolphin	2
078	unid. small whale	3
079	unid. large whale	1
098	unid. whale	2
TOTAL		157

Biopsy (Juan Carlos Salinas, Suzanne Yin, Adam Ü, Eric Archer)

Species	Common Name	# Weekly	# Weekly	Total	Total
		Samples	Takes	Samples	Takes
<i>Balaenoptera borealis</i>	Sei whale	0	0	2	7
<i>Balaenoptera musculus</i>	Blue whale	1	2	1	2
<i>Balaenoptera physalus</i>	Fin whale	2	4	7	26
<i>Delphinus delphis</i>	Short-beaked common dolphin	22	43	61	113
<i>Globicephala macrorhynchus</i>	Short-finned pilot whale	0	0	2	6
<i>Lagenorhynchus obliquidens</i>	Pacific white-sided dolphin	7	13	30	57
<i>Lissodelphis borealis</i>	Northern right whale dolphin	0	0	23	49
<i>Megaptera novaeangliae</i>	Humpback whale	0	0	1	2
<i>Phocoenoides dalli</i>	Dall's porpoise	0	0	14	19
Grand Total		32	62	141	281



Seabirds (Michael Force and Dawn Breese)

It was a remarkable week for the seabird team. Not only did we find 36 species, our second highest total of the cruise (even more surprising considering this report only includes six days of survey effort), but we were treated to plenty of surprises as well. Southbound migration is well underway. Of the 1299 birds recorded on effort, 58% were birds on the move either to southern wintering grounds or returning to the Southern Hemisphere to breed. These four species were: Arctic Tern (375), Pink-footed Shearwater (136), Buller's Shearwater (124) and Long-tailed Jaeger (119). All three jaegers (Long-tailed, Parasitic and Pomarine) essentially doubled in abundance compared with previous weeks.

As if finding a Band-rumped Storm-Petrel far off Oregon earlier this month wasn't enough, stretching incredulity even further was finding a second one 127 nautical miles west of the

Rogue River, Oregon! This species is unknown from the northeastern Pacific Ocean. Also here was a Stejneger's Petrel and Scripps's Murrelet. We found our third Brown Booby of the cruise, this one off northern California. We've now found one each in Washington, Oregon and California, all adult females. This species is extremely rare this far north, but is apparently undergoing an unprecedented northward dispersal this fall. An adult female was seen this week off the mouth of the Fraser River in British Columbia! Unexpected was finding 170 Ashy Storm-Petrels a few nautical miles off southern Oregon. In this feeding aggregation straddling the Oregon/California state line was a single Black Storm-Petrel, also very rare at this latitude. Probably the most unusual visitor was a Whimbrel of one of the Eurasian subspecies, most likely *Numenius phaeopus variegatus*, that flew past the ship late one windy afternoon.



Long-tailed jaeger, M. Force

Cetacean Photographic Sampling (Paula Olson, Adam Ü, Suzanne Yin, Elanor Miller, Bennie Johnson)

Species Code	Scientific Name	Common Name	13-19 Sep 2014		Total Cruise	
			# Sightings	# Photos	Total Sightings	Total Photos
13	<i>Stenella coeruleoalba</i>	Striped dolphin	2	15	7	107
17	<i>Delphinus delphis</i>	Short-beaked common dolphin	4	281	31	1439
21	<i>Grampus griseus</i>	Risso's dolphin			3	256
22	<i>Lagenorhynchus obliquidens</i>	Pacific white-sided dolphin	4	39	9	132
27	<i>Lissodelphis borealis</i>	Northern right whale dolphin	3	83	6	567
36	<i>Globicephala macrorhynchus</i>	Short-finned pilot whale			2	1188
37	<i>Orcinus orca</i>	Killer whale			1	248
40	<i>Phocoena phocoena</i>	Harbor porpoise			1	27
44	<i>Phocoenoides dalli</i>	Dall's porpoise			9	57
46	<i>Physeter macrocephalus</i>	Sperm whale			3	395
63	<i>Berardius bairdii</i>	Baird's beaked whale			2	390
70	<i>Balaenoptera sp.</i>	Unidentified rorqual	1	119	3	140
71	<i>Balaenoptera acutorostrata</i>	Common minke whale			1	2
72	<i>Balaenoptera edeni</i>	Bryde's whale			1	19
73	<i>Balaenoptera borealis</i>	Sei whale			4	1003
74	<i>Balaenoptera physalus</i>	Fin whale	11	1132	41	4762
75	<i>Balaenoptera musculus</i>	Blue whale	1	512	8	859
76	<i>Megaptera novaeangliae</i>	Humpback whale	4	85	16	362
99	<i>Balaenoptera borealis/edeni</i>	Sei or Bryde's whale			1	1

Individual ID's	13-19 Sep 2014	Total Cruise
SF pilot whale		2
Killer whale		1
Sperm whale	1	3
Sei whale		3
Fin whale	15	34
Blue whale	3	9
Humpback	1	9



Oceanography (Elan Portner, Gina Lonati, Dawn Breese, Elanor Miller, Eric Archer)

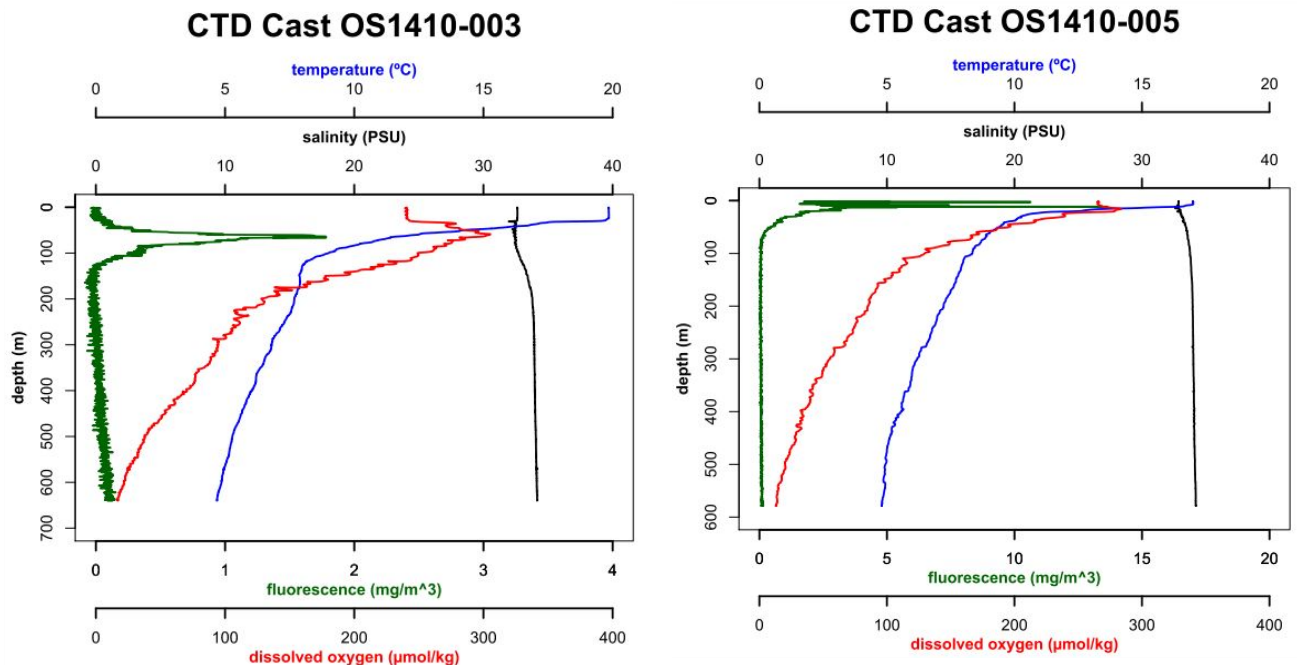
Despite 9 weather nights, the oceanography team led by Elan Portner and Gina Lonati completed 22 bongo tows, 13 vertical net tows, 15 CTD casts, and 68 XBTs (**Table 1**). Five of the 22 bongo tows were duplicate tows, performed at successfully sampled stations. These tows were performed when preliminary sorting of the plankton revealed the presence of squid larvae (**Figure 2**), high priority samples for Elan Portner, a graduate student at Stanford University interested in the distribution of the Humboldt squid, *Dosidicus gigas*. The presence of these squid in northern California and Oregon waters would represent an expansion of their normal distribution and, potentially an increase in prey availability for marine mammals in this region.

Table 1: Overview of Oceanographic sampling on Leg 2.

Date	XBTs	Bongo net tows	Vertical net tows	CTD casts	Weather days
Aug 30 – Sep 20	72	22	13	15	9

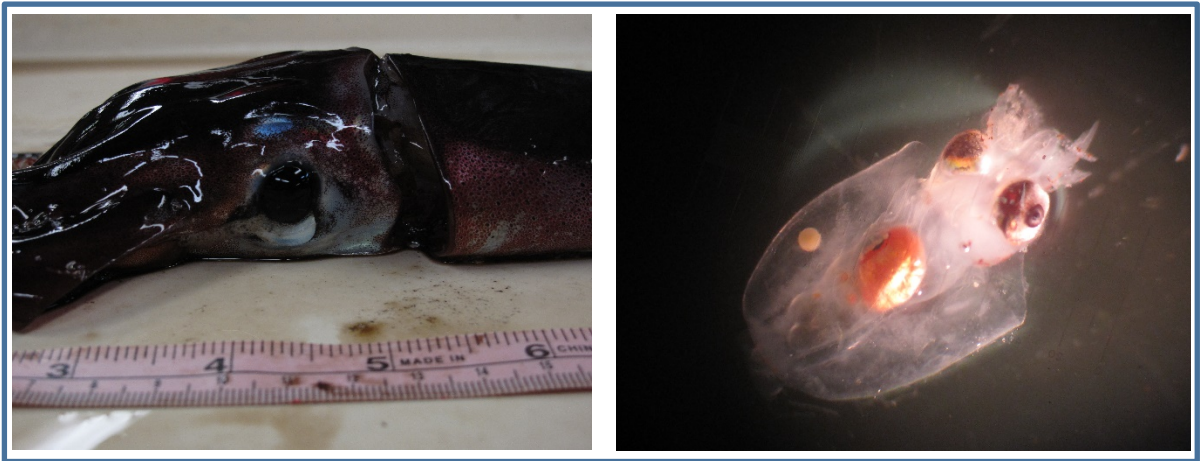
Using round-about methods, we have successfully retrieved our cast data from the CTD (See **Figure 1** for examples), but the issue preventing retrieval via normal commands has yet to be identified and resolved.

Figure 1: Physical profiles of water column along transect track lines. OS1410-003: Completed 9/1/2014, 44°04.378'N 126°49.375'W. OS1410-005: Completed 9/6/2014, 41°39.538'N 129°04.233'W. Note: scales for fluorescence differ between the two graphs.



Many hours were spent sorting plankton samples for squid larvae and pteropods (**Figure 2**). Gina Lonati, soon to be a member of the Marine Mammal Pathobiology Lab in St. Petersburg, FL, found both tiny pteropods at night and distant whales during the day, adding her enthusiasm and skill to the operations performed on the cruise.

Figure 2: Some of the squids collected on this leg, both big and small, larval and adult. Left – *Ommastrephes bartrami*, Right – Unidentified larval squid viewed through the microscope (appx. 5mm total length).



Soon to be Dr. Elanor Miller kept a watchful eye on the water column during the day with the infrequently required help of Dawn Breese, Eric Archer, and Elan Portner. Everyone on the team enjoys watching the echosounder and the patches of biomass shown to pass under our vessel. All four frequencies of the apparatus are functional and the implementation of an activation/deactivation log by Dawn Breese has helped ensure that the echosounder remains active as much as possible during daytime operations. After nine total hours of jigging effort on this leg, we have two more catches to report: both immature *Ommastrephes bartrami* caught at the surface by Jeremy Whaley (**Table 2**).

Table 2: Squid landings using line and jig.

Date	Tentative ID	Mantle length (cm)	Sex	Appx. depth of catch (m)
8/30/2014	<i>Onychoteuthis borealijaponicus</i>	27.5	F	100
9/7/2014	<i>Onychoteuthis borealijaponicus</i>	27.5	M	100
9/15/2014	<i>Ommastrephes bartrami</i>	27.3	M	1
9/19/14	<i>Ommastrephes bartrami</i>	35.9	F	1

We owe special thanks to Clint Peterson, Jeremy Whaley, George Rayford, Jr. and Mohammed Nartey of the Ocean Starr crew for their extraordinary efforts and company during long night ops in the dark.

Acoustics (Emily Griffiths, Brian Miller, Kym Collins)

Much like the first leg of our expedition, the acoustic component of this survey is comprised of three main parts. Chiefly, the bulk of our time is spent monitoring the life feed from the towed hydrophone array 300m behind the Ocean Starr. We not only detect vocalizing animals this way, we can localize their whereabouts as we travel down the transect line. Secondly, we are launching nightly sonobuoy stations, as well as opportunistic buoys during daytime sightings of high priority species (e.g. Bryde's and fin whales). And lastly, we are deploying new autonomous free-floating recording devices, known as DASBRs, to monitor the ocean soundscape at 100 meters depth without constant boat noise interference.

Towed Array Summary Table

Species	Detections
Harbor porpoise	2
Dall's porpoise	11
Unid porpoise	1
Pacific white-sided dolphin	5
Sperm whale	18
Short-beaked common dolphins	16
Unid dolphin	23
Stripped and Short-beaked common dolphins	2
Humpback whale	4
Total	82
Detections for Leg 2	157
Detections To Date	214

Sonobuoy Summary Table

Leg 2	Blue	Fin	Sei	Humpback	Bryde's	Sperm	Killer
Definite	6	11	0	4	0	3	0
Probable	6	10	0	1	0	1	0
Possible	3	0	11	3	0	0	1

This leg has been far more active than the last. Before the first half of the leg was over, we already had more detections than we did for the entire first leg! Our rate of detections didn't slow and we surpassed 200 detections, 3/4s collected on Leg 2. Though unidentified dolphins were the most common detection, that category is closely followed by sperm whale and short-beaked

common dolphin detections. On this leg we didn't detect many groups of sperm whales, but rather single animals in the same general area as one another (as detailed in our previous report).

We also recorded some fantastic humpback whale song, accurately described in the 1960s by Kibblewhite as a “barnyard chorus.” Using the program Ishmael, we were able to localize one animal approximately 0.2 nautical miles away, just aft our stern on the starboard side. Shortly thereafter, we had to pull in the array so the visual team could have better vessel maneuverability when trying to identify a different whale to species. Out on the back deck we could actually hear, with our bare ears, the singing humpback whale just behind the boat on the starboard side. Out in the open air, it is easy to understand how whale song has inspired decades of research and centuries of curiosity on cetacean vocalizations.

Acknowledgments

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